

STATUS REPORT ON THE REVIEW OF THE CRANDON MINE: August 2000

Department of Natural Resources
Box 7921, Madison, WI 53707
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What's New With DNR's Review of the Crandon Project?

- **New metallic mining Web site**
- **Preliminary mine inflow numbers**
- **The mine water contingency plan**
- **Potential effects on groundwater from the re-flooded mine**
- **Irrevocable trust fund rule**
- **Project review schedule**

New Web site unveiled

In February the Department unveiled a newly revised metallic mining Web site, which contains a wealth of new information regarding the proposed Crandon mine, the reclaimed Flambeau mine, and the general mine permitting process. The Web site includes a "What's New?" button which will be regularly updated to announce upcoming meetings. The Department intends the Web site to be easily used by anyone interested in state metallic mining issues. Any questions or comments about the Web site should be directed to Dave Kunelius in Rhinelander (715) 365-8924, or to Jeff Schimpff in Madison (608) 267-7853. The web address is:

<http://www.dnr.state.wi.us/org/aw/wm/mining/metallic/>

The DNR releases preliminary mine inflow estimates from its groundwater flow model

As previously announced, the Department and its consultants have completed the majority of the work on the preliminary regional groundwater flow model that was originally submitted by Nicolet Minerals Company in support of the permit applications and the Environmental Impact Report. The Department made many changes to the model, including significant adjustments in how the bedrock and the ore body are represented in the model.

These changes resulted in mine inflow estimates far more conservative than the estimates of the company. As a result of the modeling work, the Department developed estimates of the range of potential mine inflow rates for the proposed mine (a 'high end' and a 'low end'). The Department estimates that the high end mine inflow could be 1,580 gallons per minute, while the low end mine inflow could be 600 gallons per minute. By comparison, the company's high end estimate of mine inflow, called the practical worst case, is 775 gallons per minute. The Department's provisional or draft estimates are likely to change, however, as explained below.

In June the company announced that it would make changes to its proposed grouting plan for the underground mine. Grouting is a technique extensively used in the mining industry to reduce the amount of water seeping into a mine. By injecting a mixture of cement with small amounts of performance-enhancing additives under pressure through drill holes bored into the surrounding

bedrock, the amount of water flowing out of the rock can be greatly reduced. The company's revised plan proposes additional grouting partly down the sides of the ore body in addition to the grout blanket at the top of the mine as originally proposed. We will evaluate the proposed changes to verify the plan's effectiveness.

To evaluate how the grout plan changes could affect our predictions of water inflow into the mine, we will modify our groundwater flow model. If the re-modeling progresses as anticipated, and the revised flow model predictions differ from the current results, we will use the new model outputs as the basis for our groundwater and surface water impact analyses. Changes in our impact analyses also could necessitate changes to the company's surface water mitigation plan and its environmental monitoring plan.

Our final flow model predictions on effects of the project on groundwater and surface waters will be contained in our draft Environmental Impact Statement (DEIS). Our flow model work also will be detailed in a report to be released at approximately the same time as the release of the DEIS.

The mine water contingency plan

Due to the difference between the Department's and Nicolet Minerals Company's high end estimates of groundwater inflow into the mine, we recently required the company to submit a contingency plan for coping with the additional mine inflow that the Department's model predicts could be possible. The company initially had designed its wastewater treatment system with a 726 gallons per minute (gpm) maximum capacity and the disposal facilities with a maximum capacity of 626 gpm. Under its initial proposal, the company also would employ a variety of techniques to prevent groundwater inflow from entering the mine. Toward this end, Nicolet Minerals Company would implement several actions:

- using an aggressive grouting plan to fill the interconnected cracks in the rocks through which the groundwater might enter the mine;
- preserving the layer of massive saprolite/till, which exists at the upper surface of the bedrock and acts as somewhat of a natural groundwater barrier;
- controlling the drainage of water stored in the bedrock prior to development of the shafts; and
- sequencing the development of the ore stopes to minimize the volume of mine inflow at any given time by using data from exploratory drifts which may reveal the amount of inflow likely from a particular stope.

However, in the event that the design capacity of the wastewater treatment and discharge system is exceeded, the company has proposed the following new contingency measures:

- The currently-proposed wastewater treatment facility includes two reverse osmosis treatment trains, each having a capacity of 370 gallons per minute. If the data indicated that more inflow could be expected, the company could add up to three additional treatment trains, each at 370 gallons per minute;
- Studies show that the proposed soil absorption site, designated as Area H, could accept more water than in the current plan – up to 1,800 gallons per minute. This would require redesign of the piping system. Mounded groundwater beneath each cell would be limited;
- Alternative Area A, located just west of the proposed plant site, which was investigated during the absorption site selection process, could be developed and accept a modest amount of groundwater; and

- The company could implement a ‘continuous mitigation’ plan, in which any soft water bodies (such as Little Sand Lake, Deep Hole Lake, and Skunk Lake) requiring mitigation by the company could be mitigated year round. The company would thus be offsetting the entire loss due to mine dewatering.

The Department is evaluating this submittal, and the final proposed plan will be discussed in the draft Environmental Impact Statement.

Potential effects on groundwater from the re-flooded mine

At the end of mining, groundwater would no longer be pumped from the mine, allowing the mine workings and backfilled stopes to re-saturate as the mine re-floods and the groundwater table recovers. The groundwater table recovery would occur over a period of several years. During mining, localized groundwater flow would be directed inward toward the mine. Therefore, during this period there would be no potential for contaminants to migrate out of the mine. After groundwater recovery, however, the groundwater flow system would be similar to pre-mining groundwater flow, and outward flow gradients from the re-flooded mine would occur.

Both the Department and company are concerned about the potential for the re-flooded mine to affect groundwater quality in the bedrock around the mine. Some pollutants would remain in the underground mine from mining operations due to oxidation during the period of mine pumping.

In order to demonstrate compliance with groundwater quality standards, the company plans to develop a groundwater flow model to evaluate flow paths in and around the re-flooded mine. This information will be presented in a re-flooded mine management plan that the company will prepare to assure protection of the bedrock groundwater quality around the re-flooded mine at the end of the mining. The plan is scheduled for completion by late summer. We expect the plan to include elements identifying pollutant source minimization, contaminant containment, and water quality monitoring.

In the plan, the company could consider a series of actions to minimize the amount of pollutants in the mine both before and during the re-flooding process. The activities include the installation of high efficiency oxygen barriers in passageways to reduce mineral oxidation, the removal of spilled ore and waste rock from the mine workings, flushing of exposed surfaces at the end of mining, and high volume extraction of water from the mine workings following the re-flooding process to flush out readily accessible contaminants. In addition, areas of oxidized backfill could be removed.

Irrevocable trust

Effective February 2000, section NR 132.085, Wisconsin Administrative Code, was created, establishing the irrevocable trust agreement requirement for a company applying for a mining permit. Under this requirement, the company must propose an irrevocable trust agreement pertaining to financial responsibility in the event of environmental contamination and implementation of certain types of preventive measures. The owner of a mining site must establish the irrevocable trust fund prior to the start of mining. The trust fund would continue perpetually after mining operations have ended. The trust does not replace an owner's liability under other provisions of law, but is intended to serve as a backup source of funding.

Trust fund requirements would be based on costs associated with certain reasonably anticipated preventive measures, as well as remedial actions related to unanticipated spills, releases from mining and mining waste facilities, and replacement of damaged water supplies. The final amount of the fund and the final schedule of payments would be determined at the Master Hearing following input from all parties. The fund would be structured such that after the period of scheduled deposits by the operator, it would be self-sustaining and adequate to finance necessary preventative and remedial actions forever. The Department would review the fund every five years for adequacy and adjust it if necessary.

The trust would be maintained by a public agency, bank or financial institution in Wisconsin, and it would be a perpetual trust. Only the Department of Natural Resources could authorize payments from the trust for preventive measures to avoid adverse environmental consequences or for remediation measures at the project site. The amount deposited in the fund by Nicolet Minerals Company would apply only to the Crandon project.

Project schedule

Department staff had planned on releasing the draft Environmental Impact Statement on the proposed mine by the end of this calendar year. However, project changes including the revised grouting plan and the re-flooded mine management plan proposed by the company will necessitate additional review time by Department staff and its consultants. As a result, the release date for the draft Environmental Impact Statement will be delayed. When we receive the company's plans later this summer, we will develop a new schedule for completing our project review and releasing the draft Environmental Impact Statement.

For additional information on the Department's review of the proposed Crandon Mine, contact:

Dave Kunelius
Department of Natural Resources
P.O. Box 818
Rhineland, WI 54501

Phone: (715) 365-8924
Email: kuneld@dnr.state.wi.us